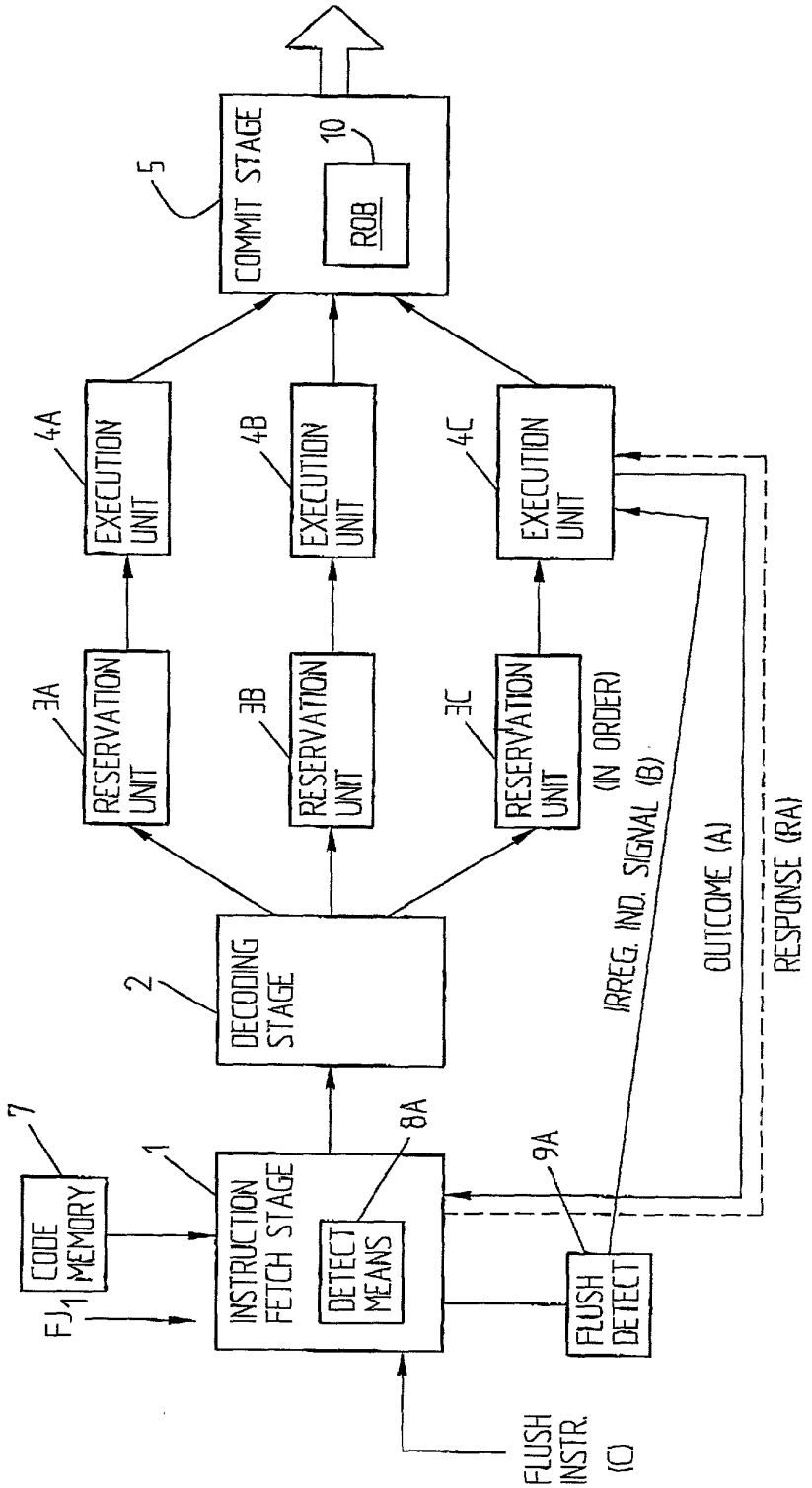
5
COMMIT STAGE
10
ROB
4A
EXECUTION UNIT
4B
EXECUTION UNIT
4C
EXECUTION UNIT
3A
RESERVATION UNIT
3B
RESERVATION UNIT
3C
RESERVATION UNIT
2
DECODING STAGE
7
CODE MEMORY
1
INSTRUCTION FETCH STAGE
8A
DETECT MEANS
9A
FLUSH DETECT
FJ1
FLUSH INSTR. (C)
IRREG. IND. SIGNAL (B)
(IN ORDER)
OUTCOME (A)
RESPONSE (RA)

Fig. 1

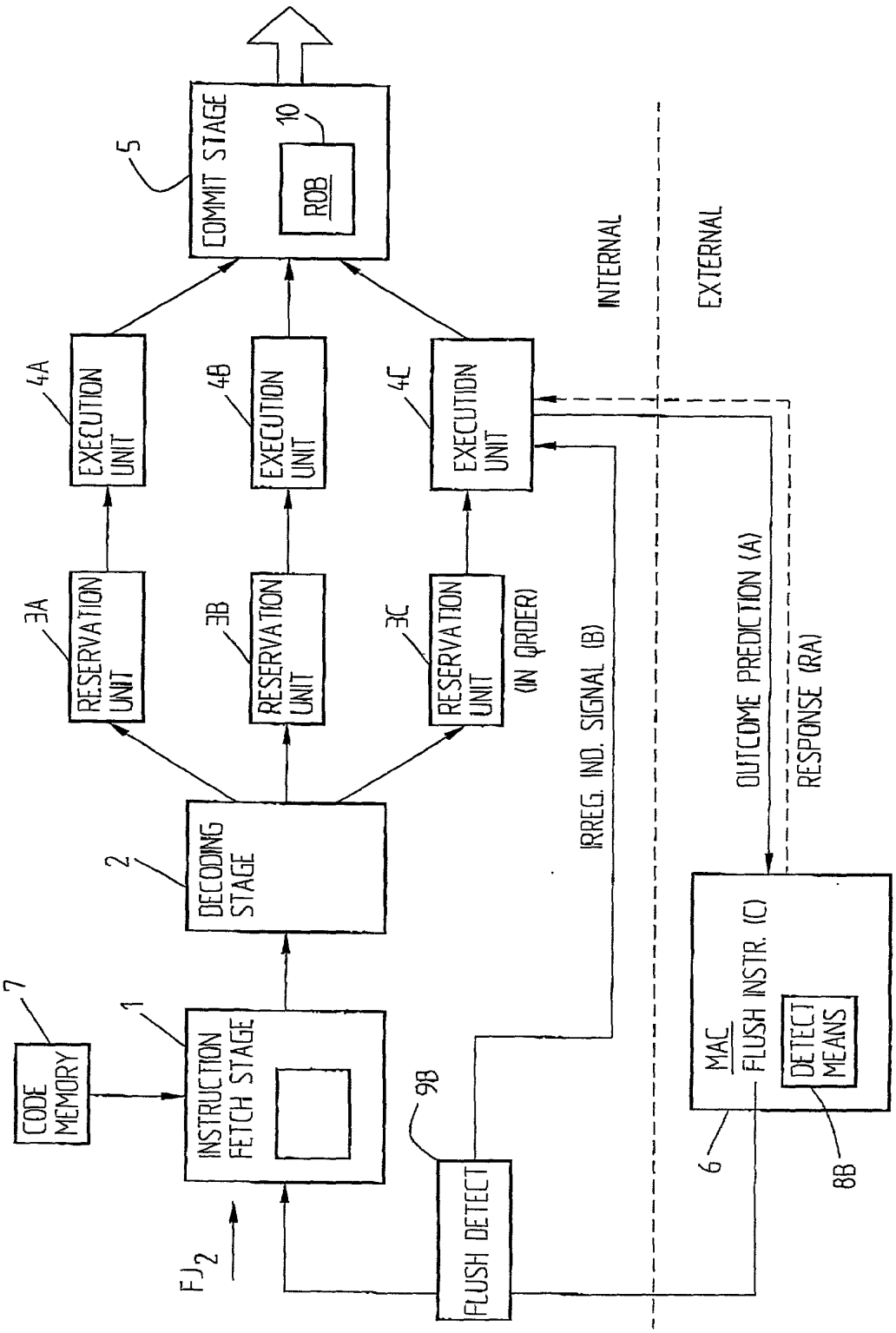
5
COMMIT STAGE
10
ROB
INTERNAL
EXTERNAL
4A
EXECUTION UNIT
4B
EXECUTION UNIT
4C
EXECUTION UNIT
3A
RESERVATION UNIT
3B
RESERVATION UNIT
3C
RESERVATION UNIT
(IN ORDER)
IRREG. IND. SIGNAL (B)
OUTCOME PREDICTION (A)
RESPONSE (RA)
2
DECODING STAGE
7
CODE MEMORY
1
INSTRUCTION FETCH STAGE
9B
FLUSH DETECT
MAC
FLUSH INSTR. (C)
DETECT MEANS
6
8B
FJ2

Fig.2

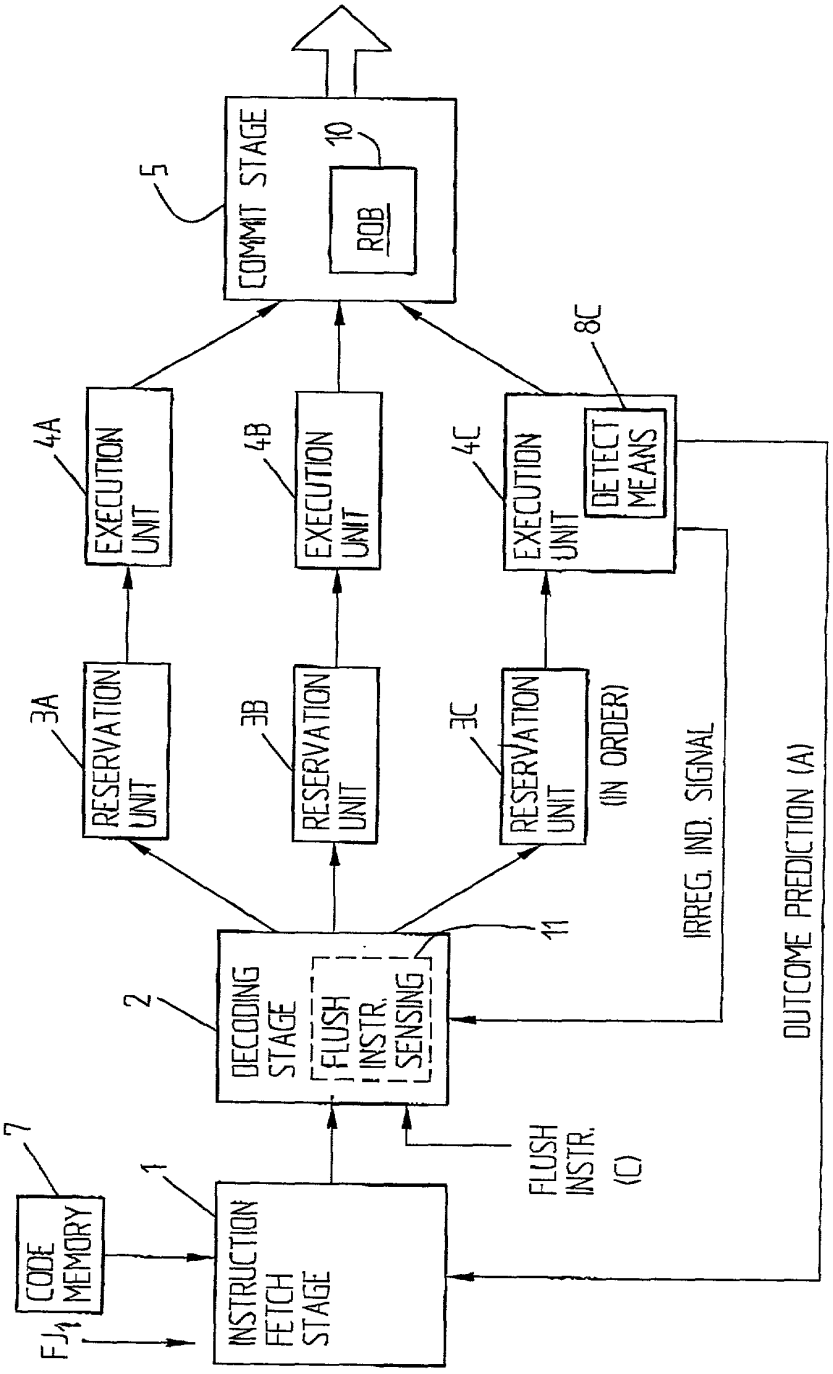
COMMIT STAGE
5
10
ROB
8C
4A
4B
4C
EXECUTION UNIT
EXECUTION UNIT
EXECUTION UNIT
DETECT MEANS
3A
3B
3C
RESERVATION UNIT
RESERVATION UNIT
RESERVATION UNIT
(IN ORDER)
IRREG. IND. SIGNAL
11
2
DECODING STAGE
FLUSH INSTR. SENSING
OUTCOME PREDICTION (A)
7
1
CODE MEMORY
INSTRUCTION FETCH STAGE
FLUSH INSTR. (C)
FJ1

Fig. 3

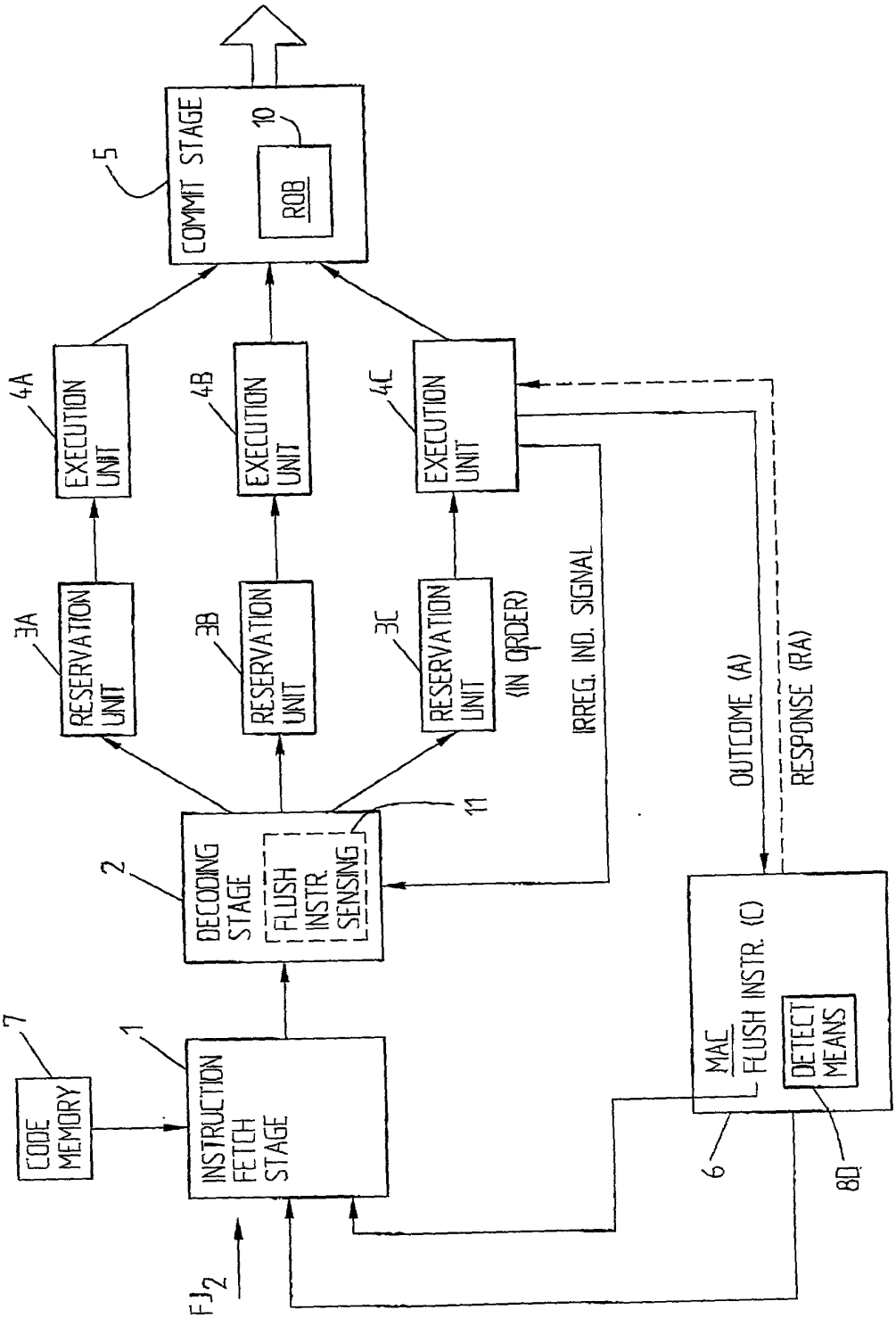
5
COMMIT STAGE
10
ROB
4A
EXECUTION UNIT
4B
EXECUTION UNIT
4C
EXECUTION UNIT
3A
RESERVATION UNIT
3B
RESERVATION UNIT
3C
RESERVATION UNIT
(IN ORDER)
IRREG. IND. SIGNAL
OUTCOME (A)
RESPONSE (RA)
11
2
DECODING STAGE
FLUSH INSTR. SENSING
7
CODE MEMORY
1
INSTRUCTION FETCH STAGE
MAC
FLUSH INSTR. (C)
DETECT MEANS
6
8D
FJ2

Fig. 4

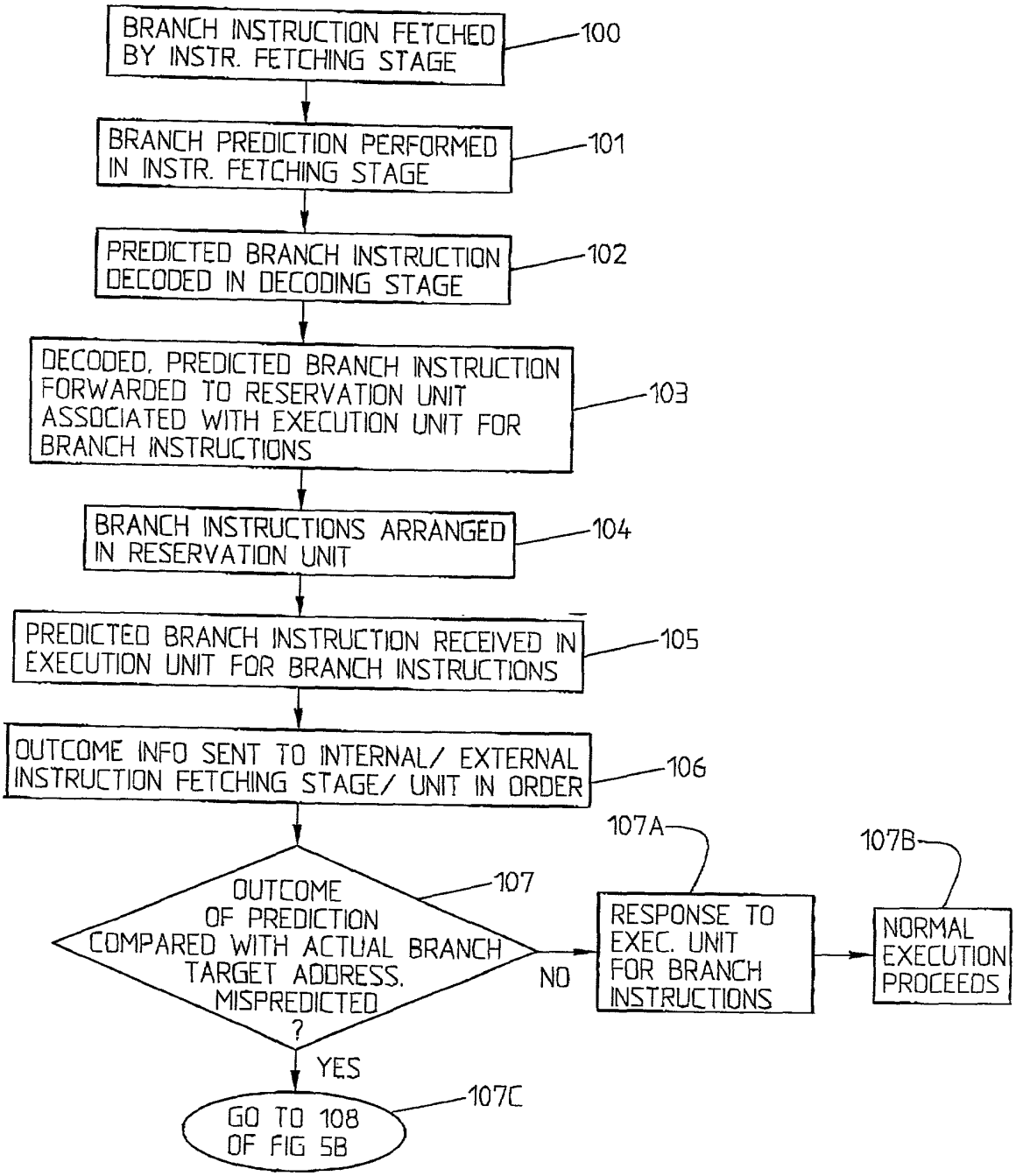
BRANCH INSTRUCTION FETCHED BY INSTR. FETCHING STAGE
100
BRANCH PREDICTION PERFORMED IN INSTR. FETCHING STAGE
101
PREDICTED BRANCH INSTRUCTION DECODED IN DECODING STAGE
102
DECODED, PREDICTED BRANCH INSTRUCTION FORWARDED TO RESERVATION UNIT ASSOCIATED WITH EXECUTION UNIT FOR BRANCH INSTRUCTIONS
103
BRANCH INSTRUCTIONS ARRANGED IN RESERVATION UNIT
104
PREDICTED BRANCH INSTRUCTION RECEIVED IN EXECUTION UNIT FOR BRANCH INSTRUCTIONS
105
OUTCOME INFO SENT TO INTERNAL/ EXTERNAL INSTRUCTION FETCHING STAGE/ UNIT IN ORDER
106
OUTCOME OF PREDICTION COMPARED WITH ACTUAL BRANCH TARGET ADDRESS. MISPREDICTED ?
107
NO
YES
RESPONSE TO EXEC. UNIT FOR BRANCH INSTRUCTIONS
107A
NORMAL EXECUTION PROCEEDS
107B
GO TO 108 OF FIG 5B
107C

Fig. 5A

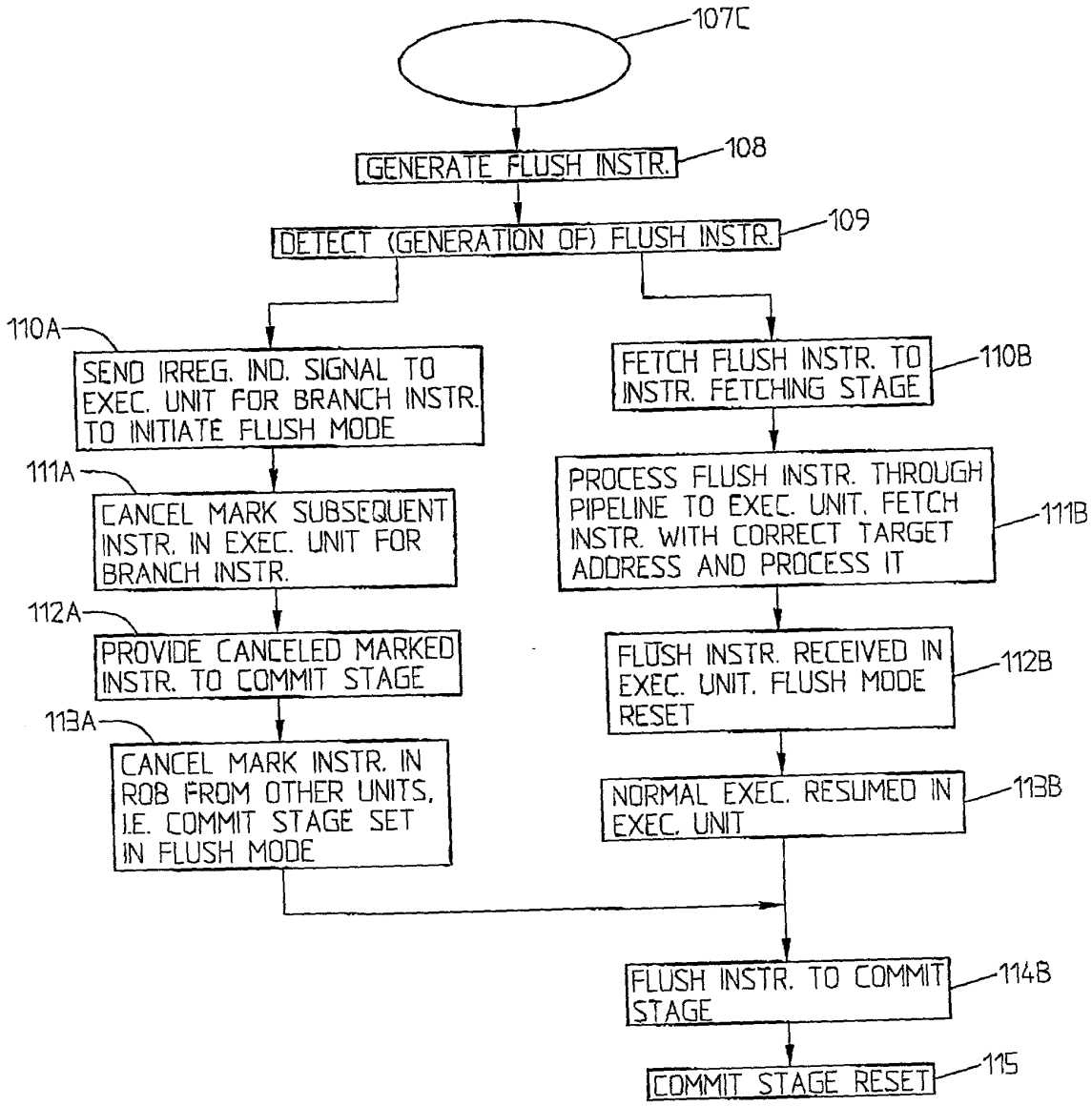
107C
GENERATE FLUSH INSTR.
108
DETECT (GENERATION OF) FLUSH INSTR.
109
110A
SEND IRREG. IND. SIGNAL TO EXEC. UNIT FOR BRANCH INSTR. TO INITIATE FLUSH MODE
FETCH FLUSH INSTR. TO INSTR. FETCHING STAGE
110B
111A
CANCEL MARK SUBSEQUENT INSTR. IN EXEC. UNIT FOR BRANCH INSTR.
PROCESS FLUSH INSTR. THROUGH PIPELINE TO EXEC. UNIT, FETCH INSTR. WITH CORRECT TARGET ADDRESS AND PROCESS IT
111B
112A
PROVIDE CANCELED MARKED INSTR. TO COMMIT STAGE
FLUSH INSTR. RECEIVED IN EXEC. UNIT. FLUSH MODE RESET
112B
113A
CANCEL MARK INSTR. IN ROB FROM OTHER UNITS, I.E. COMMIT STAGE SET IN FLUSH MODE
NORMAL EXEC. RESUMED IN EXEC. UNIT
113B
FLUSH INSTR. TO COMMIT STAGE
114B
COMMIT STAGE RESET
115

Fig.5B

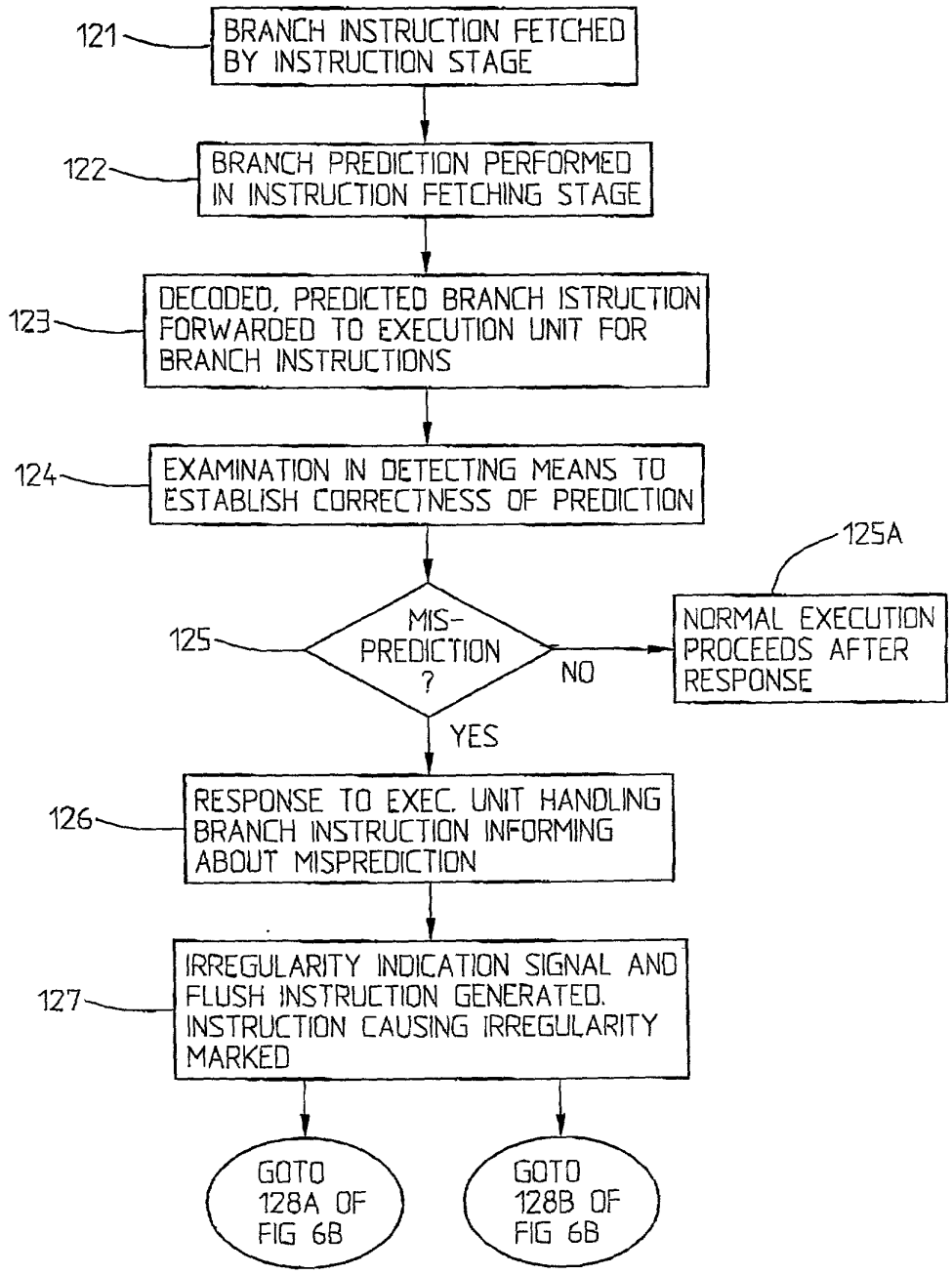

Fig. 6A

09/965,961 - 09/27/01

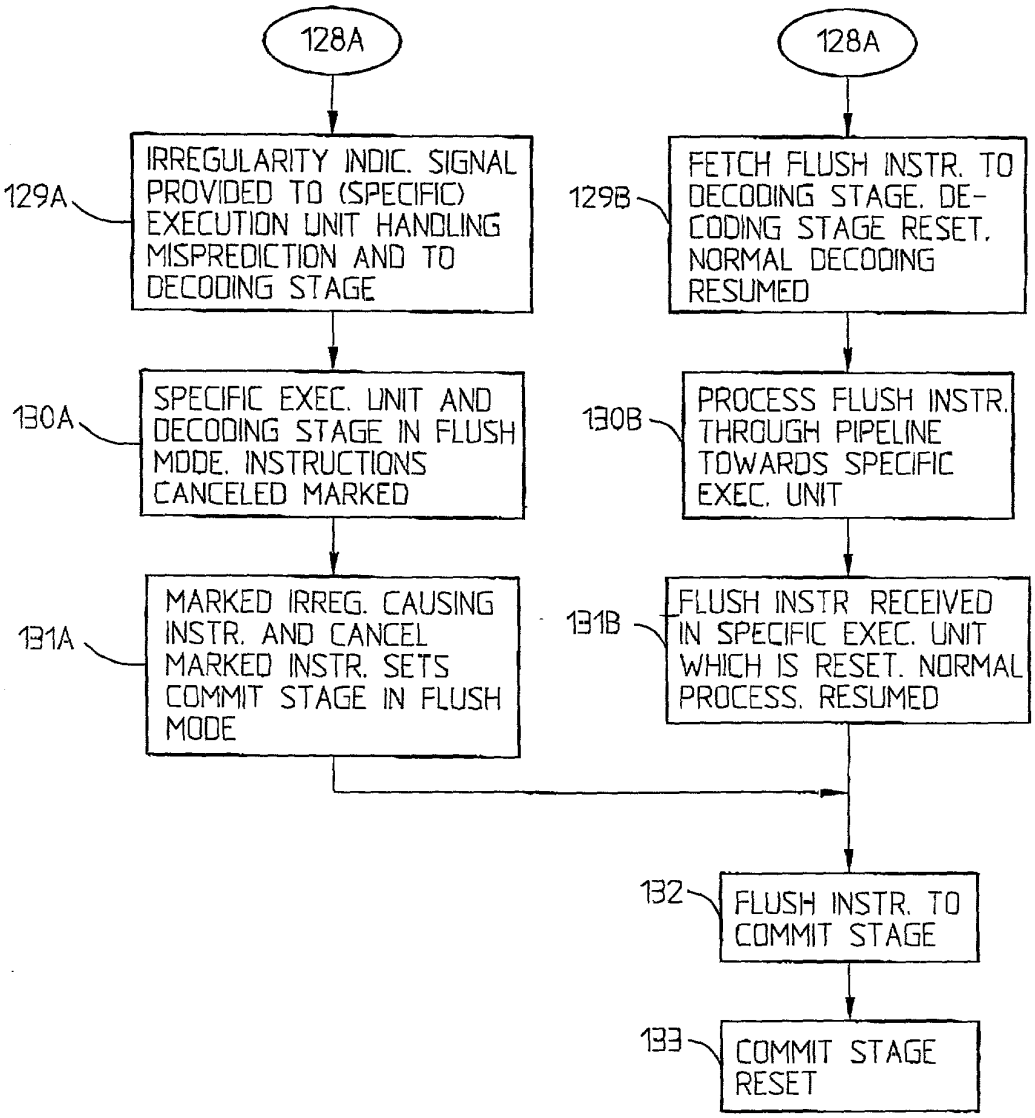
128A
128A
IRREGULARITY INDIC. SIGNAL PROVIDED TO (SPECIFIC) EXECUTION UNIT HANDLING MISPREDICTION AND TO DECODING STAGE
129A
FETCH FLUSH INSTR. TO DECODING STAGE. DECODING STAGE RESET. NORMAL DECODING RESUMED
129B
SPECIFIC EXEC. UNIT AND DECODING STAGE IN FLUSH MODE. INSTRUCTIONS CANCELED MARKED
130A
PROCESS FLUSH INSTR. THROUGH PIPELINE TOWARDS SPECIFIC EXEC. UNIT
130B
MARKED IRREG. CAUSING INSTR. AND CANCEL MARKED INSTR. SETS COMMIT STAGE IN FLUSH MODE
131A
FLUSH INSTR RECEIVED IN SPECIFIC EXEC. UNIT WHICH IS RESET. NORMAL PROCESS. RESUMED
131B
FLUSH INSTR. TO COMMIT STAGE
132
COMMIT STAGE RESET
133

Fig. 6B

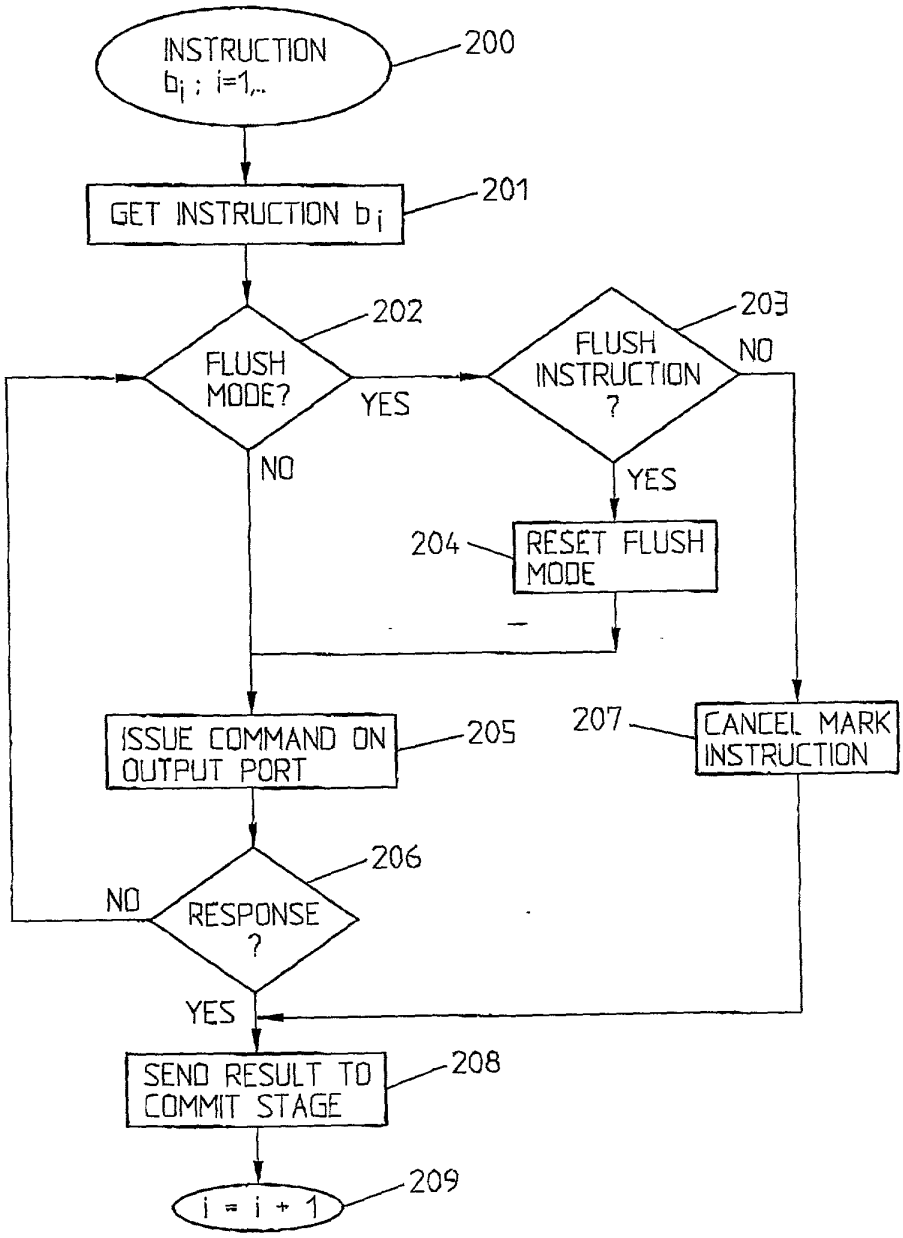
INSTRUCTION
b_i ; i=1,..
200
GET INSTRUCTION b_i
201
FLUSH MODE?
202
YES
NO
FLUSH INSTRUCTION ?
203
NO
YES
204
RESET FLUSH MODE
ISSUE COMMAND ON OUTPUT PORT
205
207
CANCEL MARK INSTRUCTION
RESPONSE ?
206
NO
YES
SEND RESULT TO COMMIT STAGE
208
i = i + 1
209

Fig. 7

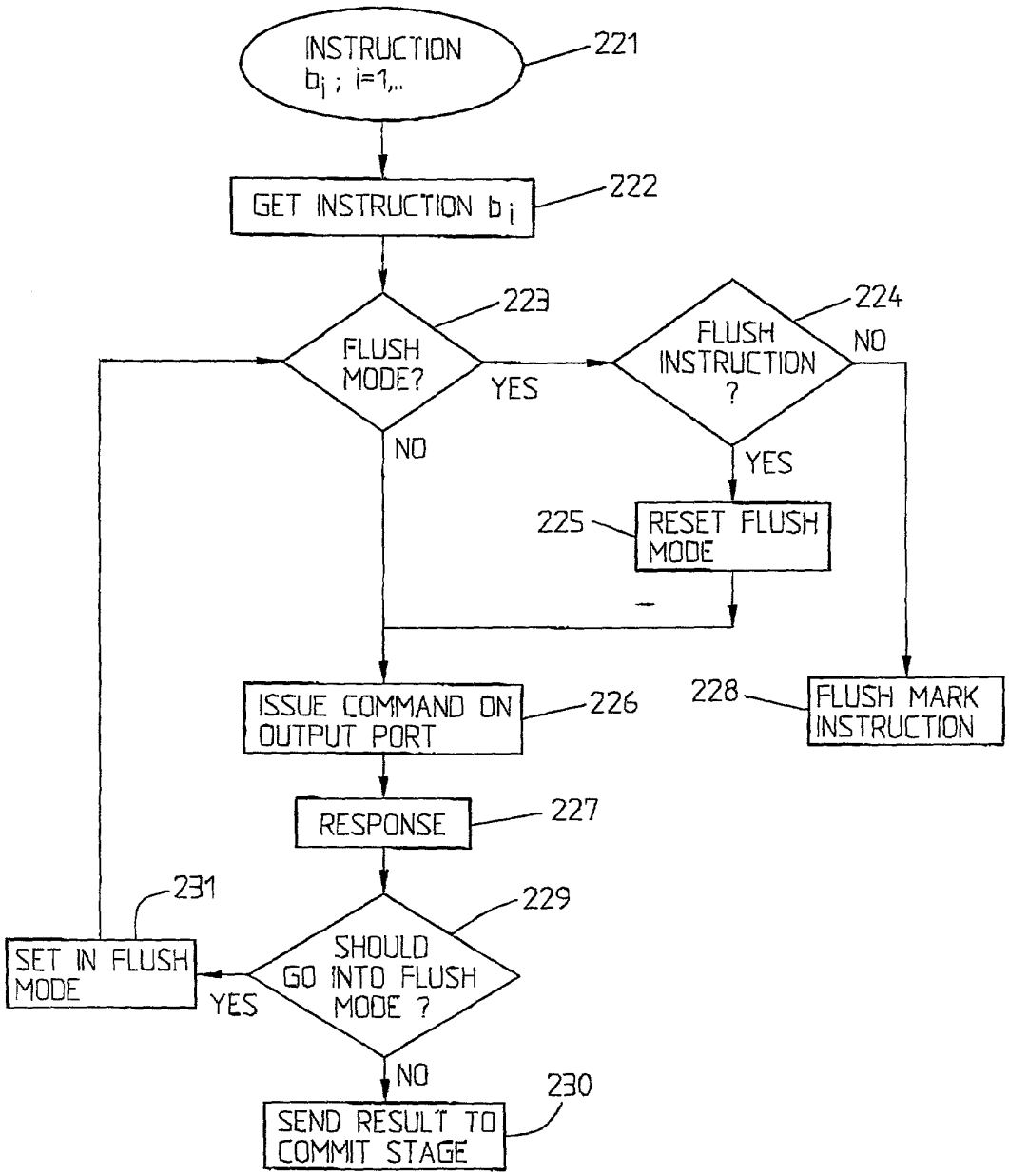

Fig. 8

Ericsson Exhibit 1025, Page 10

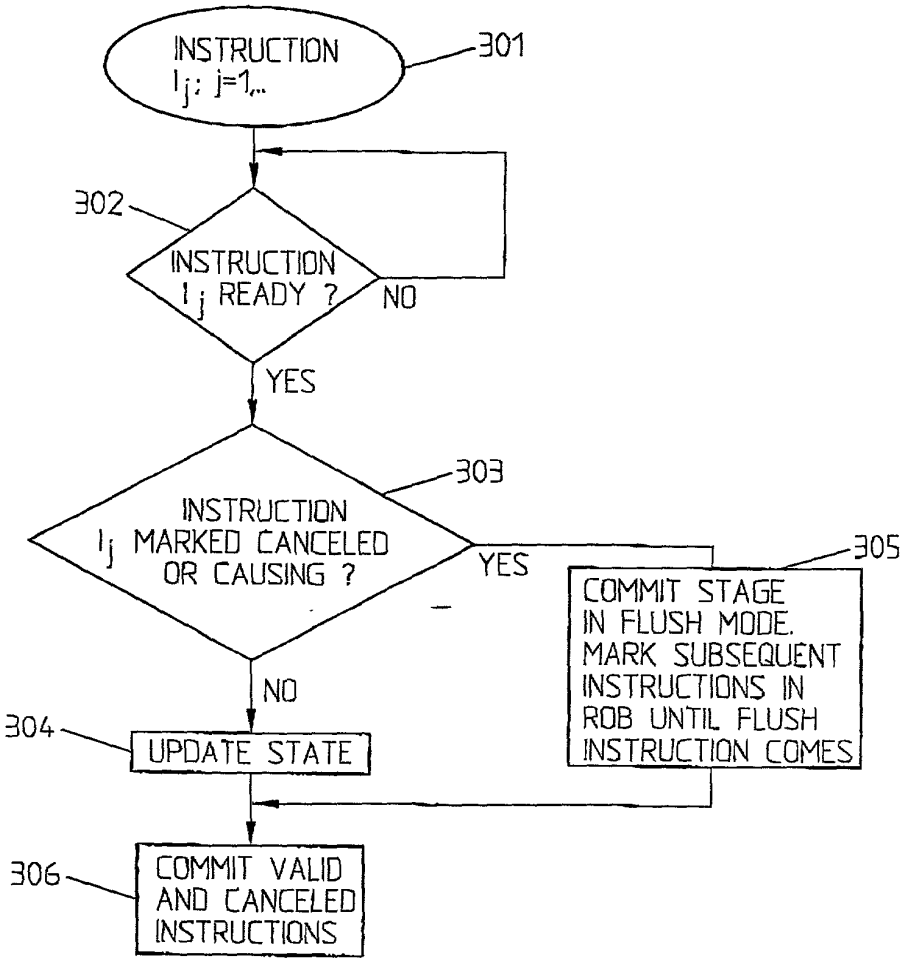
INSTRUCTION
I_j; j=1,..
301
302
INSTRUCTION
I_j READY ?
NO
YES
303
INSTRUCTION
I_j MARKED CANCELED
OR CAUSING ?
YES
305
COMMIT STAGE
IN FLUSH MODE.
MARK SUBSEQUENT
INSTRUCTIONS IN
ROB UNTIL FLUSH
INSTRUCTION COMES
NO
304
UPDATE STATE
306
COMMIT VALID
AND CANCELED
INSTRUCTIONS

Fig. 9

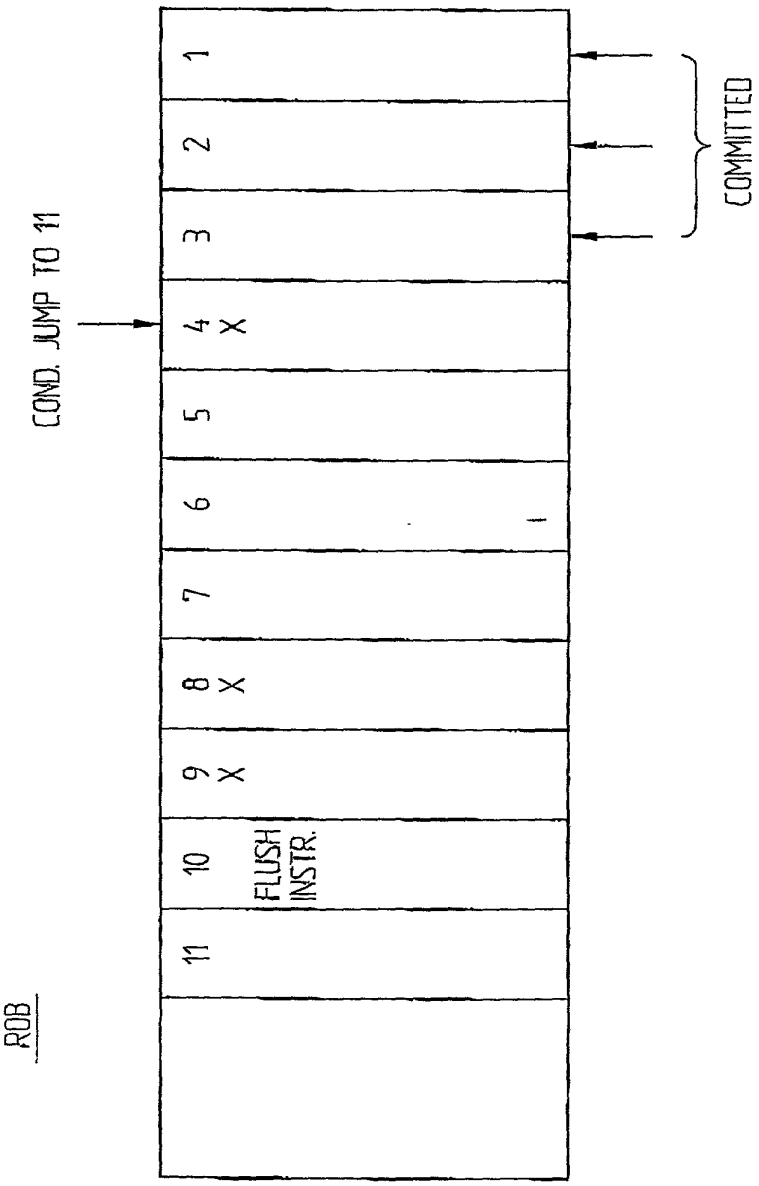
ROB
11
10
FLUSH INSTR.
9 X
8 X
7
6
5
4 X
COND. JUMP TO 11
3
2
1
COMMITTED

Fig. 10